NON-PUBLIC?: N
ACCESSION #: 8912180061
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Arkansas Nuclear One, Unit One PAGE: 1 OF 03

DOCKET NUMBER: 05000313

TITLE: Reactor Trip Caused by the Inadvertent of a Reactor Protection System Power Supply During Surveillance Testing Due to an Inadequate Procedure
EVENT DATE: 11/10/89 LER #: 89-037-00 REPORT DATE: 12/11/89

OTHER FACILITIES INVOLVED: N DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 074

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Larry A. Taylor, Nuclear Safety and Licensing Specialist TELEPHONE: (501) 964-3100

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On November 10, 1989 at approximately 2255, a reactor trip occurred as a result of the inadvertent grounding of a Reactor Protection System (RPS) power supply during surveillance testing. The grounding resulted in the loss of the RPS power supply and deenergized the reactor power auctioneering circuit for the Integrated Control System (ICS) which resulted in a reactor power/feedwater flow mismatch. The ICS automatic response to this mismatch was to reduce feedwater flow to the steam generators and to withdraw control rods. These actions resulted in a rise in Reactor Coolant System (RCS) temperature and pressure and a
reactor trip at 2355 psig. The initial plant response following the trip was as expected, with all post trip parameters being normal. However, due to various steam leakage paths in the secondary system, the steam

generator pressures gradually decayed to approximately 860 psig and RCS temperature decreased to 535 degrees. The cause of this event was an inadequate procedure which required connecting a test lead to a soldered connection in the back of the RPS cabinet. This connection was within one eighth inch of the connection which was inadvertently grounded. The RPS calibration procedure was revised to specify taking the required reading from a more suitable location. In addition, an evaluation was performed to identify and recommend appropriate corrective actions for long standing secondary system deficiencies.

END OF ABSTRACT

A. Plant Status

At the time of this event, Arkansas Nuclear One, Unit One (ANO-1) was operating at approximately 74 percent of rated power. Reactor coolant System (RCS) AB! pressure was 2150 psig and RCS average temperature was 579 degrees. The "D" reactor coolant pump (RCP) was out of service due to an oil leak.

B. Event Description

On November 10, 1989 at approximately 2255, a reactor trip occurred as a result of the inadvertent grounding of a Reactor Protection System (RPS) JC! power supply during surveillance testing.

A portion of the 18 month RPS channel calibration, which is normally performed during refueling outages, was being performed at power in order to reduce the work load during an upcoming, short duration mid-cycle outage. During the performance of the RPS channel "B" calibration, an Instrumentation and Control technician inadvertently touched the wrong connection while attempting to connect a test lead to a soldered connection located in the back of the "B" RPS cabinet. This action caused the circuit breaker for the -15 volt direct current (VDC) power supply for RPS channel "B" to trip. Loss of the RPS channel "B" power supply deenergized the reactor power auctioneering circuit for the Integrated Control system (ICS) JA!. The loss of the reactor power signal to the ICS resulted in a reactor power/feedwater flow mismatch. The ICS automatic response to this mismatch was to reduce feedwater flow to the Once Through Steam Generators (OTSG) and to withdraw control rods to increase power. The reduced feedwater flow caused a decrease in beat transfer capability, a rise in RCS temperature and pressure, and a reactor trip on high RCS pressure at 2355 psig. The initial plant

response following the trip was as expected, with all post trip parameters being normal. However, due to various steam leakage paths in the secondary system, the OTSG pressures gradually decayed (approximately 30 minutes) to 870 psig for a "A" OTSG and 860 psig for the "B" OTSG. The decrease in OTSG pressures in turn caused RCS average temperature to decrease to 535 degrees. These values are slightly below those normally anticipated during post trip conditions (pressure - 1005 psig, temperature - 545 degrees).

The major contributor to the OTSG pressure degradation and associated RCS cooldown was stem leakage through the moisture separator reheater (MSR) isolation valves, then through manually positioned MSR distiller level control valves to high pressure heaters E-1A and B. The relief valves on the shell side of the high pressure heaters lifted, relieving steam to the atmosphere. Other sources of steam leakage included the feedwater pump turbine stops and governor valves, and the main turbine bypass valves.

The operators recognized the abnormal post trip response and took timely and appropriate corrective actions to isolate the various steam leakage paths. The plant was stabilized in the hot shutdown ' condition at approximately 2340.

At 0335 on November 11, 1989, reactor startup was commenced. The main turbine was tied to the line on November 12 at 1605.

C. Safety Significance

During this event, a reactor trip was initiated at an RCS pressure of 2355 psig, as required. and all control rods inserted. All plant parameters remained within normal bands with the exception of OTSG pressures and RCS average temperature. which were slightly lower than normally anticipated during post trip conditions. The operators took timely and appropriate corrective actions to stabilize the plant in the hot shutdown condition. Although the malfunctioning of secondary system components complicated the operator's post trip responses, they did not create any significant safety problems. Therefore, the safety significance of this event Is considered minimal.

D. Root Cause

The root cause of this event was determined to be an inadequate procedure. The RPS calibration procedure called for attaching a

test lead to a soldered connection in the back of the RPS cabinet which is in close proximity to other connections. The connection which was Inadvertently touched by the technician initiating the trip was approximately 1/8 inch from the specified test point.

E. Basis for Reportability

This event is reportable pursuant to 10CFR50.73(a)(2)(iv) as an automatic actuation of the RPS.

This event was also reported in accordance with 10CFR50.72 on November 10, 1989 at 2400.

F. Corrective Actions

The appropriate procedures were revised to specify a more suitable location in the RPS cabinets to get the required measurements.

Additionally, after a subsequent reactor trip on November 14, 1989 (LER 50-313/89-038-00), during which secondary system problems similar to those experienced during this trip were observed, a Secondary Systems Evaluation Team was formed to address long standing problems associated with the operation of ANO-1 secondary plant systems.

The objectives of the team were to identify the long standing material problems on the ANO-1 secondary plant that created the need for operator compensatory actions during transients. The problems were addressed individually and on an integrated system operation basis to determine which deficiencies required correction prior to restart from the mid cycle outage currently in progress.

As a result of these assessments, six items were identified as significant enough to require action prior to restart. These six deficiencies were:

o Main Steam Turbine bypass valves do not fully close.

o Feedwater pump turbine high pressure stop and governor valves leak.

o Main steam isolation valves to the second stage moisture separator reheater coils leak excessively.

o Moisture Separator reheater distiller level controller is inoperable.

o Heater drain tank T40 high level dump valves leak excessively.

o Main feedwater pump recirculation valves leak excessively.

Appropriate corrective actions will be implemented with respect to each of these deficiencies prior to restart from the outage currently in progress.

G. Additional Information

There have been no previous events in which reactor trips occurred during surveillance testing due to an inadequate procedure.

Energy Industry Identification System (EIIS) codes are indicated in the text as XX!.

ATTACHMENT 1 TO 8912150061 PAGE 1 OF 1

AP&L Arkansas Power & Light Company
Arkansas Nuclear One
Route 3, Box 137 G
Russellville, AR 72801
Tel 501 964 3100

December 11, 1989

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U.S. Nuclear Regulatory Commission
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SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51 Licensee Event Report No. 50-313/89-037-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(iv), attached is the subject report concerning a reactor trip which was caused by the inadvertent grounding of a Reactor Protection System power supply during surveillance testing due to an inadequate procedure.

Very truly yours,

E.C. Ewing
General Manager,
Technical Support
and Assessment

ECE/RHS/sgw
attachment
cc: Regional Administrator
Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

INPO Records Center
1500 Circle 75 Parkway
Atlanta, GA 30339-3064

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